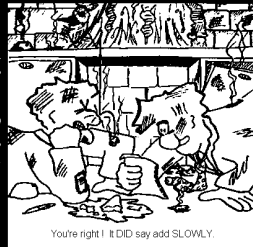


Safety in Science Class

(mainly related to chemical use)



Safety in Science Class

- The Occupational Health and Safety Act (OHSA)
- Health and Safety Regulations
- WHMIS: Workplace Hazardous Materials Information System
- Chemical Classification: National Fire Protection Association (NFPA)
- TDSB "Stay Safe" document and "Science Chemical List"

The Occupation Health and Safety Act

- Employers
 - required to provide safe working conditions, information and training
 - required to provide all necessary protective equipment for their employees

The Occupation Health and Safety Act

- Manufacturers and suppliers
 - must ensure products they sell will not endanger health and safety of the user
 - obliged to provide information about the hazards of their products

The Occupation Health and Safety Act

- Employees
 - have a duty to take reasonable care for health and safety of themselves and others
 - co-operate with employers with respect to health and safety issues

Health and Safety Regulation (made under OHS Act)

- Reg 857 Teachers
 - applies to teachers
 - consistent with the Education Act
- Reg. 860 WHMIS
 - gives workers information about hazardous materials used in the workplace

Employers' Safety Policies

Under OHSA employers must:

- prepare and review annually a written health and safety policy
- develop and maintain a program to implement the policy

Employers (Board) H&S Policy must contain:

- General statement about the OHSA
- Statement about the induction procedures for new staff, and the on-going training of existing staff
- a list of do's and don't for all science staff (locking laboratories, no consumption of food or drink...)
- specific employer/board safety requirements (e.g. banded chemicals or procedures)
- Emergency procedures; Remedial procedures all staff are expected to take before first aid arrives

So you bought a new chemical for your laboratory...

SUPPLIER LABEL:

- Chemical name
- WHIMIS SYMBOL (page 3...stay safe)
- Available MSDS (Material Safety Data Sheet)
- Precautionary measures for safe use
- First aid measures
- Supplier information

Chemical Classification: NFPA symbol system

RED

Flammability:

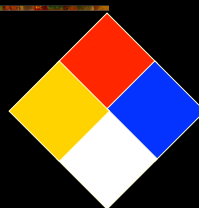
4 = fp < 73F

3 = fp < 100F

2 = fp > 100F < 200F

1 = fp > 200F

0 = will not burn



* fp = FLASH POINT...temp at which a liquid gives off vapour in quantities significant enough to form an ignitable mixture with air. Given an external source of ignition, a material can ignite at or above its fp.

Chemical Classification: NFPA symbol system

YELLOW

Reactivity:

4 = explosive at Room Temp.

3 = shock/Δ may detonate

2 = violent reaction with water

1 = unstable if heated, not violent,

0 not reactive with water



Chemical Classification: NFPA symbol system

BLUE

Health Hazard:

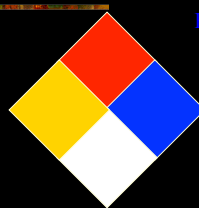
4 = deadly,

3 = extreme,

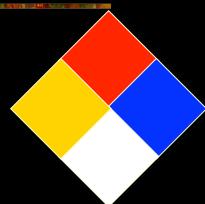
2 = hazardous,

1 = slight,

0 = normal



Chemical Classification: NFPA symbol system



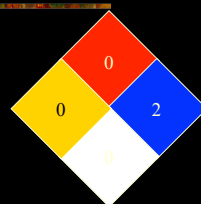
WHITE Specific/
Contact Hazard:

ACID, ALK, CORR, NO WATER

ONLY ONE NOT RATED FROM 0-4

An example: Cupric Sulphate, 5-Hydrate

RED
Flammability



BLUE

Health Hazard:
2 = hazardous

YELLOW
Reactivity

WHITE

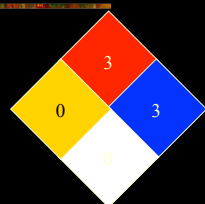
Specific/Contact
Hazard

NUMBERS 0-4 indicate severity of hazard.

0-least, 1-slight, 2-moderate, 3-high, 4-extreme

An example: Ethyl Alcohol

RED
Flammability:
3 = fp < 100F



BLUE

Health Hazard:
3 = extreme danger

YELLOW
Reactivity

WHITE

Specific/Contact
Hazard

NUMBERS 0-4 indicate severity of hazard.

0-least, 1-slight, 2-moderate, 3-high, 4-extreme

TDSB Science Chemical List

■ List of chemical categorized as:

- A – Acceptable
- B – Banned: DO NOT USE
- C – Restricted Use: TEACHER DEMOS OK, or MICRO SCALE LABS...at the teacher's discretion...

TDSB Science Chemical List

■ Chemical Storage Codes...use NFPA colours...

- RED: Flammables
 - Separate water compatible (ethyl alcohol) from water incompatible (Na, Li, K)
- YELLOW: Reactivity hazard
 - Oxidizers must be separate from flammables

e.g.: peroxides should be kept away from acetone, kerosene

TDSB Science Chemical List

■ Chemical Storage Codes...use NFPA colours...

- BLUE: Health hazard
 - Store in secure (only teacher accessible) poisons area.
- WHITE: Contact hazard
 - Acids* separate from bases.

Nitric Acid should be stored alone. Can you figure out why?

Safe Laboratory Practices...

- ✓ **KNOW** the safety equipment layout of the room (e.g.: eye wash, fire blanket, emergency exit...)
- ✓ **GO OVER** safety rules and emergency procedures with students
- ✓ **POSTERS** are a good way of visually reminding students of laboratory safety
- ✓ Wearing **GOGGLES** is not negotiable; neither is open toed shoes, contact lenses, chewing gum, sitting down...

Safe Laboratory Practices...

- ✓ Separate **BROKEN** glassware container
- ✓ Heating Sources:
 1. **BUNSEN BURNERS**
 - never with flammables!
 - heat solids almost horizontally
 - can heat non flammable liquids at 45°

Safe Laboratory Practices...

- ✓ Heating Sources (continued):
 2. **HOT PLATES**
 - excellent for heating liquids...again heating of flammable liquids is not recommended
 3. **HOT WATER BATHS**
 - best method for heating flammable liquids

Safe Laboratory Practices...

- ✓ Handling Chemicals...some important points...
 - when diluting acids remember the alphabet...**A**cids are added slowly to **W**ater.
 - use a stirring rod when transferring liquids to avoid spills

Safe Laboratory Practices...

- ✓ Handling Chemicals...some important points...
 - dispose of waste appropriately...refer to MSDS
 - **Inorganic waste**...anything above Z= 20;
 - **Organic waste**
 - Workplace labels should contain:
 - chemical name,
 - instructions for safe use
 - reference to MSD

see page 4 of "STAY SAFE".

Additional Information

- http://www.esao.on.ca/downloads/ohsi_package/sample_teaching.htm extra information related to safety
- Stay Safe from STAO (Senior grades)
- Be Safe from STAO (1-8)
- <http://www.stao.org>